

RE: PER Drainage design review

(b) (4)
[REDACTED]@eaest.com>

Wed 11/13/2013 1:58 PM

To: Sturgeon, Randy <Sturgeon.Randy@epa.gov>;

Cc: (b) (4) [REDACTED]@eaest.com>;

Categories: PER

Randy,

EA has reviewed (b) (4) [REDACTED] study to address the existing (pre-development) and proposed (post-development) conditions flow in the ditch along the PER/3975 Elm Avenue property boundary. This information was received by EA from Dave on 11 November 2013. Following our review of the calculations and drawings, Dave has satisfied EA's question of whether or not the flow conditions in the ditch will improve following the planned development of the PER property.

The ditch study used existing flow rates and existing ditch geometry to evaluate the ditch capacity and resulting water surface elevations. The study also evaluated the proposed geometry of the ditch, with the wall in place, and the reduced flow assuming the portion of PER drainage currently flowing into the ditch will no longer reach the ditch in the proposed developed condition (due to the proposed wall). EA further compared the existing condition water surface elevations in the ditch with the water surface elevations (hydraulic grade line-HGL) in the proposed pipe as previously submitted by Dave. Based on the information provided, the following is a summary of the results of our review for the pre-development and post development conditions:

At Cross Section A-A/Proposed STMH-1: The existing (pre-development) top of ditch elevation at this location (STMH-1) is 7.1 feet. The pre-development condition water surface elevation in the existing ditch caused by the 10 year storm is greater than elevation 7.1 feet, causing runoff to inundate a portion of the 3975 property. Therefore, the ditch currently does not have capacity to contain the 10-year or 100-year storms. The proposed (post-development) HGL in the pipe at this location (STMH-1) is 6.52 feet for the 100-year storm indicating that the 100-year flow will be contained in the ditch after construction of the wall and pipeline. The ditch bottom at this location is at elevation 5.8 feet, so there will be a maximum of 0.72 feet of water in the ditch while the pipe is conveying the peak flow. As the storm peak passes, the ditch will drain down and runoff will be conveyed through the proposed storm drain pipe.

At Cross Section B-B/Proposed STMH-4: The existing conditions top of ditch elevation is 4.6 feet. The pre-development condition water surface elevation in the existing ditch caused by the 10 year storm is greater than elevation 4.6 feet, causing runoff to inundate a portion of the 3975 property. Therefore, the ditch currently does not have capacity to contain the 10-year or 100-year storms. The proposed (post-development) HGL in the pipe at this location (STMH-4) is 2.91 feet for the 100-year storm and the ditch bottom (flared end section of STMH-4) is at elevation 2.5 feet, resulting in 0.41 feet of ponding water in the ditch while the pipe is conveying the peak flow. As the storm peak passes, the ditch will drain down and runoff will be conveyed through the proposed storm drain pipe.

So bottom line, at both locations (STMH -1 and STMH-4), the post-development conditions are an improvement over the pre-development conditions and will be able to pass a 100 year design storm without flooding.

Please forward on to the PER team as appropriate, and let me or Jason Coleman know if you have any questions.

Thanks,

(b) (4)

From: Sturgeon, Randy [mailto:Sturgeon.Randy@epa.gov]

Sent: Monday, November 11, 2013 6:10 PM

To: (b) (4)

Subject: FW: PER Drainage design review

(b) (4), I am sure you will anyway... Pls review ASAP. If what he wrote is accurate, we should be good to go!?

Thx, Randy

Randy Sturgeon

Remedial Project Manager

EPA Region 3

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From: (b) (4) gallupsurveyors.com>

Sent: Monday, November 11, 2013 11:36 AM

To: (b) (4)

Cc: Sturgeon, (b) (4) @advantusstrategies.com; (b) (4) @salmonsinc.com

Subject: Re: PER Drainage design review

Gentlemen,

See my response to comment 4 below, along with the attachments. Please call or write me if you have any questions.

Thanks-

David Butler

----- Original Message -----

From: [Pellissier, Pete](#)

To: [Dave Butler \(dave@gallupsurveyors.com\)](#)

Cc: [Sturgeon, Randy \(Sturgeon.Randy@epa.gov\)](#); (b) (4)

(b) (4) [@advantusstrategies.com](#); (b) (4) [@advantusstrategies.com](#); (b) (4)

[@salmonsinc.com](#)

Sent: Wednesday, October 23, 2013 1:55 PM

Subject: PER Drainage design review

(b) (4),

EA has reviewed the latest drainage design and calculations for the PER property sent to EA on October 22. EA concurs with the submitted calculations and approach to manage the 100-year runoff from the 3975 Elm Avenue property. However, the pre- versus post-development ponding conditions have still not been quantified along the 3975 Elm Avenue/PER property line to show improvements to drainage conditions (see

#4 below). The storm drain plan view layout has not changed since the last submittal but the storm drain pipe sizes have been increased and the pipe inverts have generally been lowered to decrease the water surface elevations in the system during the 100-year rainfall event. Additionally, a TideFlex valve has been added to the outfall of the storm drain system which conveys water from the 3975 Elm Avenue property. The following are EA comments provided to you on October 2 (in black) followed by EA's observations of the revised October 22 submission in red:

1. The times of concentration for runoff to reach each inlet appear high. This would affect the rainfall intensity, design flow rates, and performance of the system. Please confirm that 20-25 minutes is appropriate for the small drainage areas, especially since much of the area contains impervious surfaces.

The times of concentration have been revised and are appropriate for the drainage area size and land use. Additionally, the runoff coefficients (indicating imperviousness) have been revised to assume the 3975 Elm Avenue property will be fully developed in the future. Previous comment has been satisfied.

2. There appears to be a problem with the hydraulic grade line (HGL) calculations. Many of the computed HGLs are below the pipe inverts (Inlets 7, 6A, 4, 3, 2, 1, and 1A). This may be due to the friction slope used in the HGL calculations which are significantly different from the pipe slopes.

The hydraulic grade line calculations have been revised. The HGLs downstream of the 3975 Elm Avenue property are well below the proposed ground elevation of the PER improvements. HGLs along the 3975 Elm Avenue/PER property boundary are discussed in detail below.

3. Once the HGLs are corrected, it will be important to check the HGL at each manhole/flared end section (FES) along the PER/3975 Elm Avenue property line to make sure water is not ponding along the proposed retaining wall. As a suggestion, it appears that the storm drain could be lowered to accommodate total capture of runoff from the 3975 Elm Avenue property with no backup. See attached "property line" pdf for concept. Please provide similar cross sections at critical points along the retaining wall for review (especially at STMH-4). Mr. (b) is concerned with additional flow/velocity along the 3975 Elm Avenue property undercutting the existing concrete pad on his property. A cross section with HGL shown (similar to the attached pdf) may ease those concerns.

The HGL at each manhole/FES along the 3975 Elm Avenue/PER property line are contained within the existing ditch. There are 5 FESs along the property line that collect runoff from the 3975 property ranging in size from 12 inches to 36 inches. Water will pond in the ditch while the storm drain is flowing full during the 100-year storm event up to 1 foot as runoff enters the FESs.

4. Pete met with Mr. (b) on 9/24 to discuss drainage patterns of the 3975 Elm Avenue property. Attached is an annotated C2 sheet indicating the drainage patterns on the property as described by Mr. (b) (6) and as confirmed during the visit. EA strongly suggests using similar drainage area delineations to the attached annotations to demonstrate to Mr. (b) that his concerns have been addressed. Also, Mr. (b) is very concerned about the capacity of the ditch between the PER property and his, and he is also very concerned about maintaining positive drainage from this area in the pipe along the swale alignment you are proposing. EA strongly suggests that you perform a pre-development conditions analysis to demonstrate that the proposed PER development will improve the drainage along the PER/3975 Elm Avenue property boundary in the post-development condition. This could be demonstrated through improved water surface elevations and lack of ponding in the ditch between the two properties.

The drainage areas have been revised per EA recommendations and recommended flow patterns have been accounted for. There is ponding in the ditch of up to one foot while runoff enters the storm drain

system. Although the system has been designed to collect runoff and convey flows to the outfall effectively, without any significant ponding, it is unknown how this compares to the pre-development condition water surface elevations in the ditch as a pre-development analysis was not performed for comparison. EA still strongly suggests showing a calculation for the pre-development condition runoff and corresponding depth in the property line ditch for comparison to the post-development condition. It is anticipated that a simple flow rate calculation for the 3975 Elm Avenue property and a cross section calculation using Manning's equation would be sufficient to show the pre-development flow depth in the ditch. Additionally, EA recommends adding check dams immediately downstream of each lateral inlet/FES into the main pipeline along the PER/3975 Elm Avenue property boundary to more effectively collect and drain the runoff from the ditch and to reduce the potential of bypass.

Check dams have been added just downstream of flared end sections at structures 1, 1A, 2, and 3. See plan sheets C4 and C5 and detail shown on sheet C7. Calculations for pre and post ponding elevations for two cross sections, A-A and B-B are provided on three 8.2 x 11 sheets. Conclusions on the bottom of sheets 2 and 3 show a lower water surface elevation in the ditch, post developed situation. The ditch in a pre developed state does not have adequate capacity for most of its length. The ditch, altered with the addition of a retaining wall, has capacity and 100 year flows are contained. The reason for the radical difference in pre and post states is most of the water that outfalls to the ditch from the (b) (6) side is intercepted by a new flared end section and piped in an storm sewer independent of the PER storm sewer. Additional, some of the overland flows from the PER site are eliminated in the post development state. See 2 attached drainage area maps. The (b) water is piped and outfalls in the upper reaches of the current ditch and because of lack of slope and the general geometry of the trapazoidal ditch, it does not have capacity for the design storm in its existing predeveloped state. If and when the (b) tract is developed, PER will have provided a storm sewer to accommodate 100 year (quantity, not quality) flows from the (b) site.

Please let (b) (4) or myself know if you have any further questions.

(b) (4)